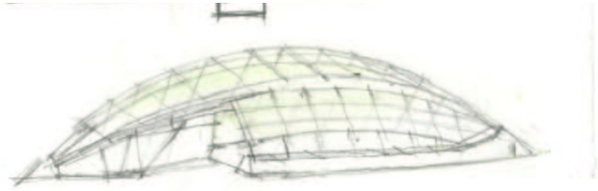
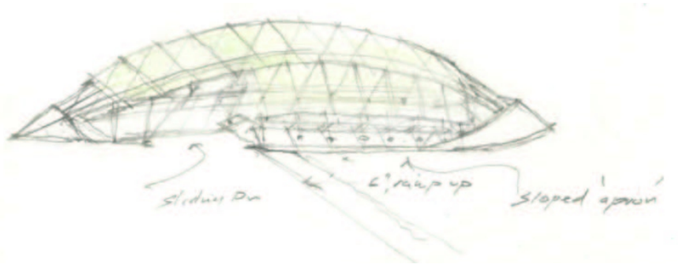
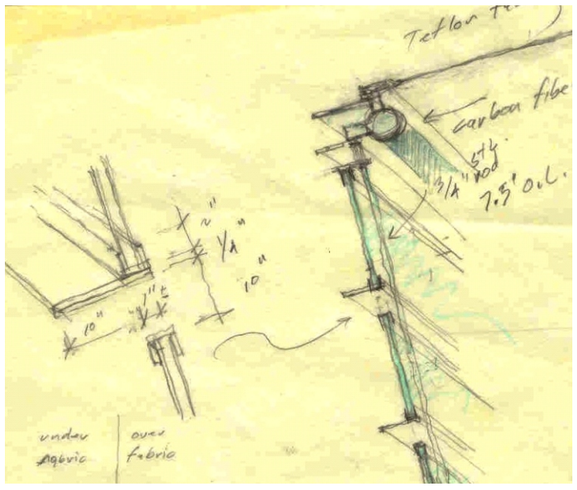
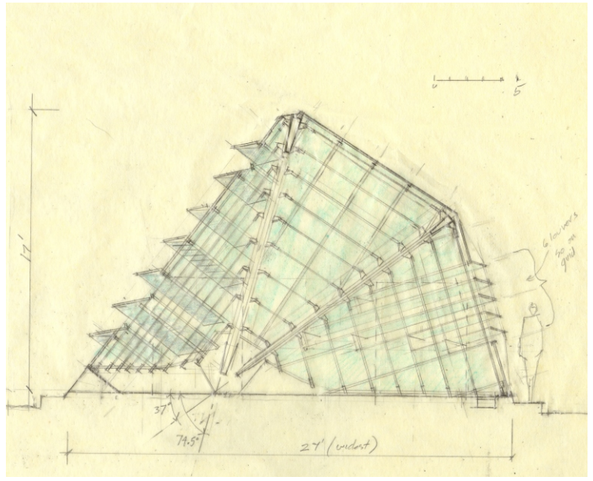


Massing Studies





Louver Detail Study



Side Elevation Study

Design Concept

Program/Objective:

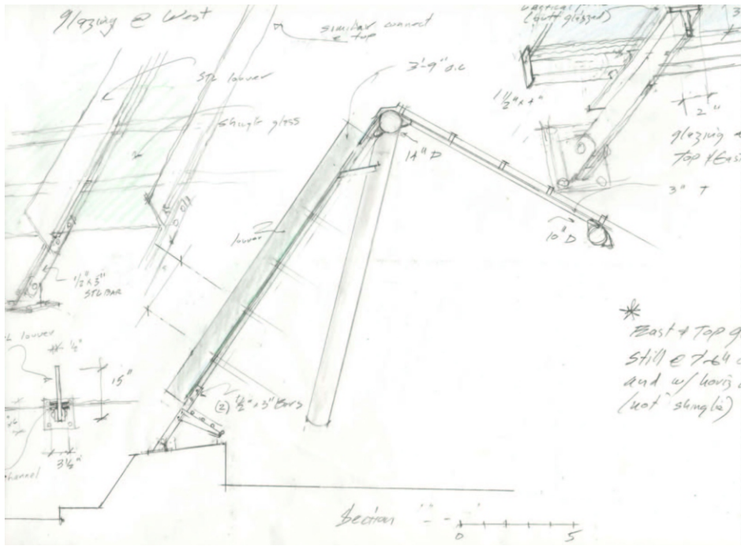
The (BTC) provides the opportunity to establish a model facility to enhance transportation options in the center of Washington. The approximately 1,750 sf. structure will be divided into two areas: Bicycle Parking and Retail. The retail area will provide the following services: Bicycle Rental, Repair and Retail Accessories. The facility will include the following program elements:

- . Secure parking for 180 bicycles (interior)
- Non-secure parking for 20 bicycles (exterior)
- Short term parking for 10 bicycles (exterior)
- Changing Rooms
- 40 short and long term Lockers
- Retail area - 450 sf
- Storage 50 sf.

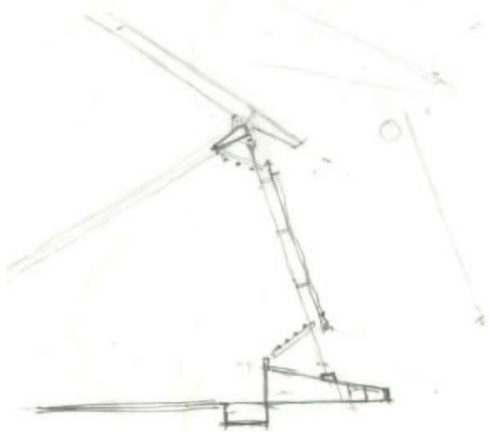
In addition to providing the above program elements, the center should serve as a catalyst to stimulate bicycle use and alternative transportation means as an extension to the existing transit modes at Union Station. The facility should take advantage of its prominent location to become a visible transportation model as well as a focal center for the bicycle community.

Design Issues:

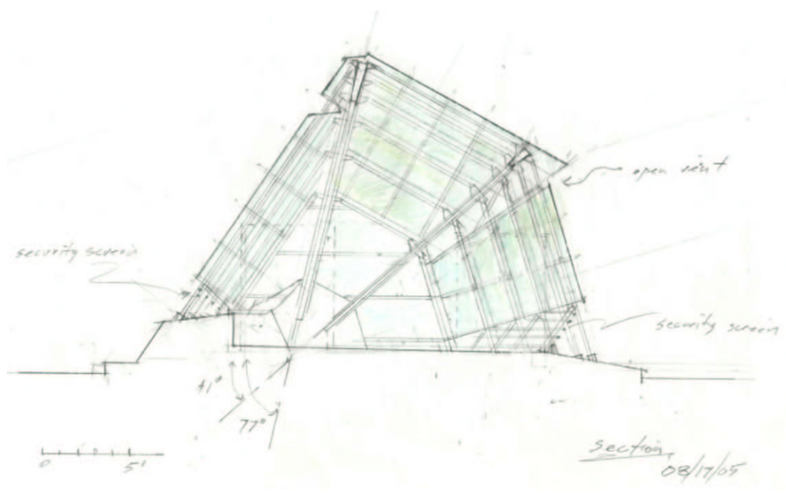
The adjacent vehicular and pedestrian circulation placed demands on the footprint of the structure and it's location. Occasional bus access to the parking structure to the north required that the site accommodate two north south access lanes west of the portico as well as the proposed (BTC). Just as significant were the approach vistas to Union Station from Massachusetts Ave and Columbus Plaza. The West Portico of the station accommodates major entries to the station as well as contains the metro entrance and retail functions. Locating the structure to minimize obstruction to these vistas was a priority as well as to not compromise the existing uses at the West Portico. Ideally, maintaining a comfortable separation between the structures would allow the new facility to compliment Union Station while maintaining its integrity.



Structural Elements Study



Section Study



Section Study

Design Approach:

The Bicycle Transit Center will be a peripheral extension to Union Station presenting a new choice of transportation options for its users. As such it should be seen as peripheral design component to the station. An early recognition by all involved recognized the need to separate and differentiate the center from its predecessor in order to maintain the integrity of the historic Union Station and allow the (BTC) to reflect its own needs ultimately better serving the community. While “differentiating” itself from Union Station itself, the Center does merge with its surroundings adapting the vocabulary of the bronze portals and “colonnades” of lamps on First Street and the building's periphery. The identification of “separation and differentiation” similarly is a theme that runs throughout the design process as a means of respecting its architectural context and linking to its broader context - providing a state of the art transit facility for Washington of 2005.

Siting

A number of siting options were studied varying the structures adjacency to the portico and its relationship to the proposed bus lanes. Approaches emphasizing a “pavilion in the plaza” were preferred. Recalling the original plaza enclosed by the west portico and original vaulted Train Room extension to the north, the arrangement promoted a pedestrian friendly use of the current obsolete asphalt drive and ramp access. By pulling the structure away from the portico, conflicts with the functioning of the West Portico Entry and Metro Entry are avoided.

Massing

In order to differentiate the structure from the verticality of the Station and the monumental the large scale arches of the portico, a gentle rising of the ground plan to a shallow vault defines the buildings massing. Inclined glazed surfaces meet the earth rather than “walls” allowing lines of sight to flow over the structure.

Enclosure

This “non-building” without walls and roof, per sec, is transparent and distinctly different than the granite-clad walls of the station. In fact the glazed panels in contrast will be more like a transparent lens allowing the station to be seen through it as one move around the plaza. At the same time it will discretely promote its purpose providing alternative modes of transit for visitors and commuters.

Efficiency of Structure

Efficiency of Structure

Compression and Tension

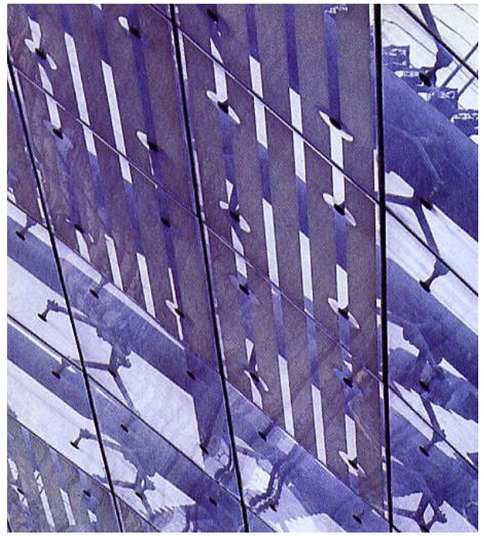
Historic Precedents

Though the center will stand in contrast to the massive granite walls adjacent to it, it will indeed relate to its context. More appropriately it will reflect the surrounding First Street bronze lamps and portal structures fronting Columbus Circle as mentioned above. The original riveted steel platform canopies out of sight but nonetheless relevant are also recalled in the details of its construction.

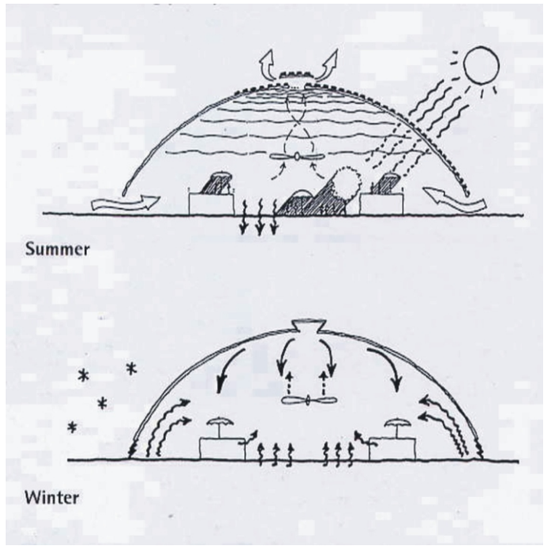
The triumphal arch is repeatedly referenced in the monumental vaults and clerestories of Union Station in of Burnham's design heralding an “American Renaissance” following the Columbian Exposition at the turn of the Century. The arch is again referenced as the shallow vault in the transit center as a humble recognition of the ongoing celebration of travel as its modes evolve with time.

Structure

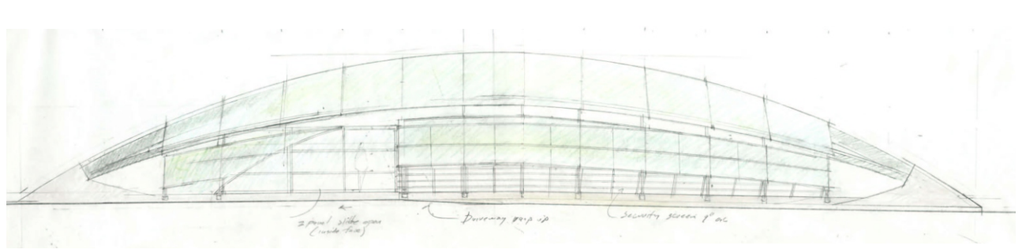
Reflecting the structural elegance of a bicycle in the center’s design was a constant goal. The triangulated tubing frame and rim and spoke wheel maximize lightness and efficiency by responding to specific conditions. The rim, in pure compression, balanced and stabilized by the spokes, in pure tension, creates an enormously efficient and elegant structure. The BTC solves the challenge of vaulting in a similar manner. The length of the structure is spanned by longitudinal steel tube vaults. They are stabilized by a series of transverse tension members wrapping the vaults and carrying loads to the perimeter of slab. These tension members in turn double as support for the glazed panel system. In a similar manner the vaults are tied together longitudinally by the slab minimizing loads transferred to the roof of the metro station below. Inherently stable and acting as a shell or “helmet” the structure provides a continuous open flexible space. The structure will accommodate the changing needs of the BTC as it evolves with time.



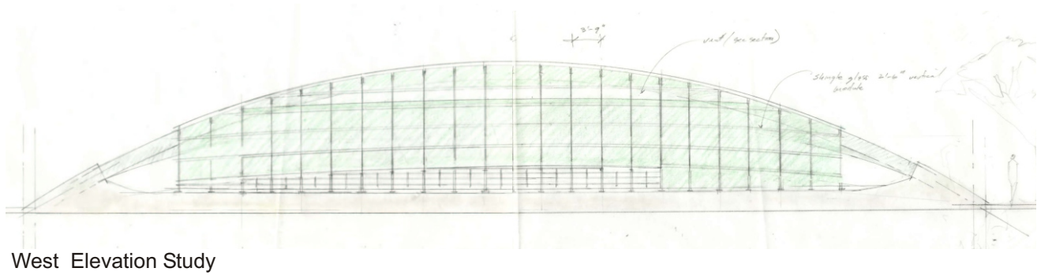
Louvers to control Heat Gain



Passive Systems respond to Seasonal Changes



East Elevation Study



West Elevation Study

Environmental Issues

The BTC could be described as something between a canopy and a building. The entire structure partially open, will take advantage of passive airflow when possible. The temperature of the parking area typically will be moderated by passive means or minimal mechanical ventilation only at seasonal temperature extremes. Because of the more demanding requirements of the retail segment it will be provided the option to close its enclosure and mechanically heart or cool the space.

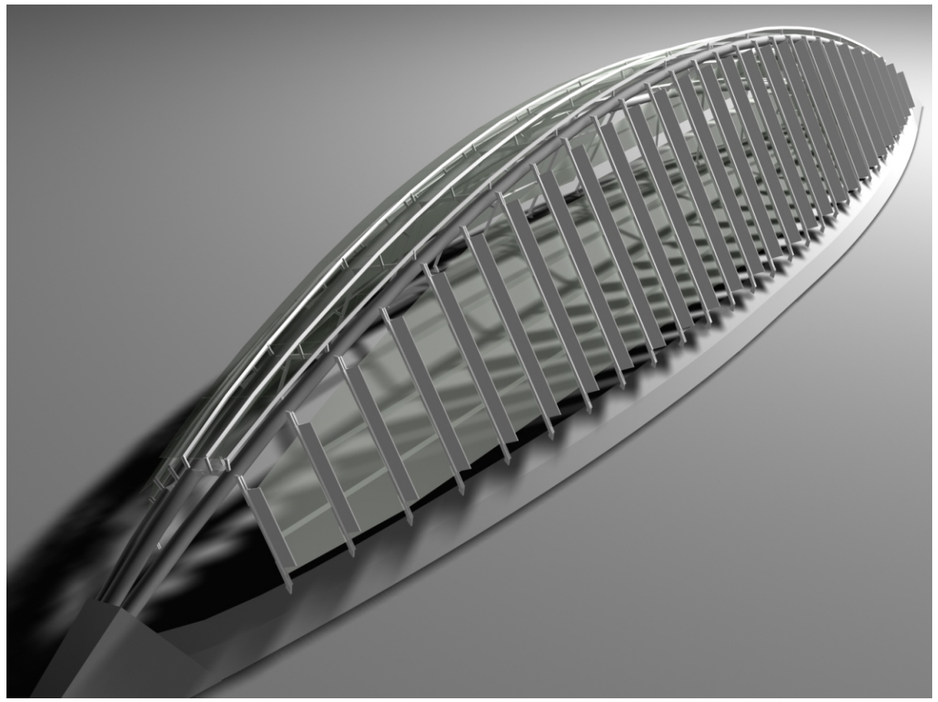
The design of the building's skin takes the environmental factors into account. The east and west exposure are differentiated. Like an eye it opens to Union Station with transparent glazing. To the west - the “eye lid” is more opaque and protected. The east orientation has minimal solar exposure, due to the adjacent west portico. It is a series of rotated and warped glazed planes acting as horizontal louvers allowing airflow but protecting from the elements. The west orientation, exposed to direct sun as well as the elements, is a single warped plane. It is open at the top and bottom taking advantage of the chimney effect to promote air movement through the structure. Vertical louvers will help shade the late afternoon sun. Additionally low-E coated single glazing will limit heat gain but allow visibility. Rotating west to east, the coating will progressively lessen in each “louver” allowing full transparency on the east most surfaces.

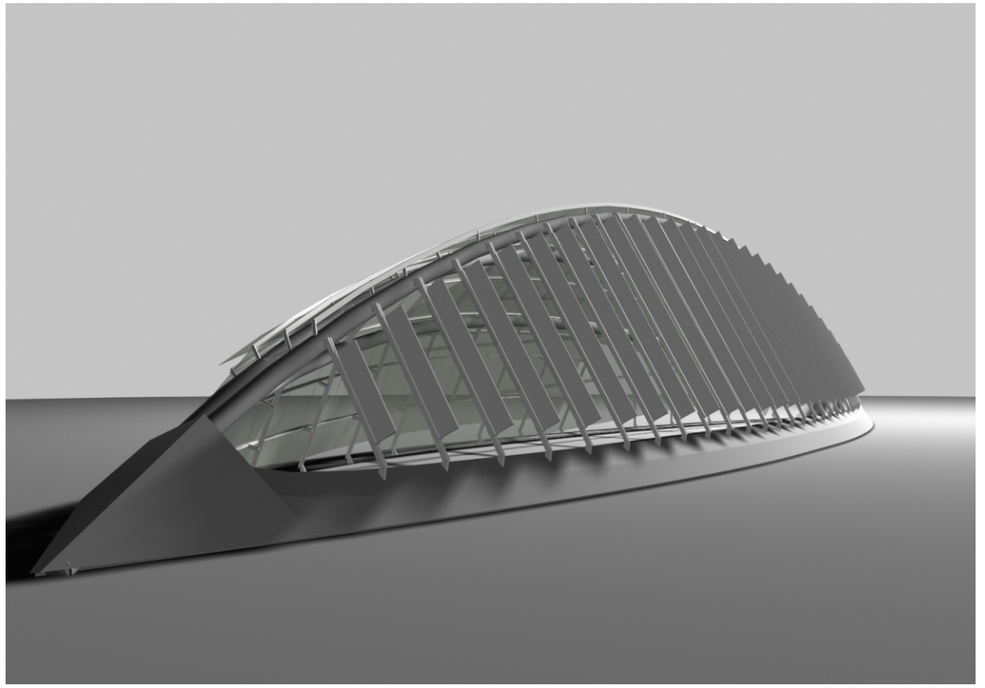
Description and Operation

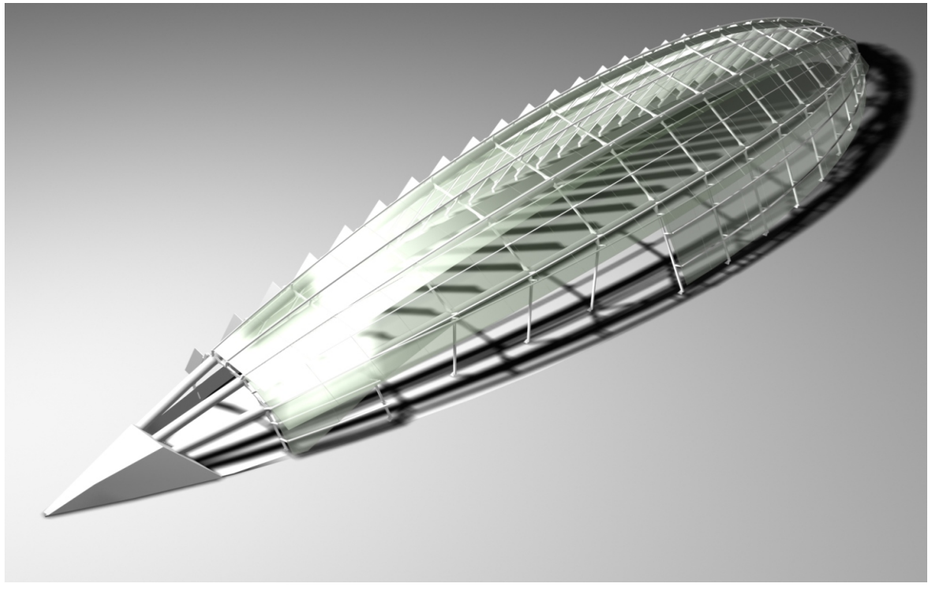
The (BTC) will be a secure facility enclosed either by glazed panels or metal security screens in areas to facilitate airflow. The facility will be accessible 24-7, controlled by an access card distributed to all the members. The retail staff will control entry during business hours.

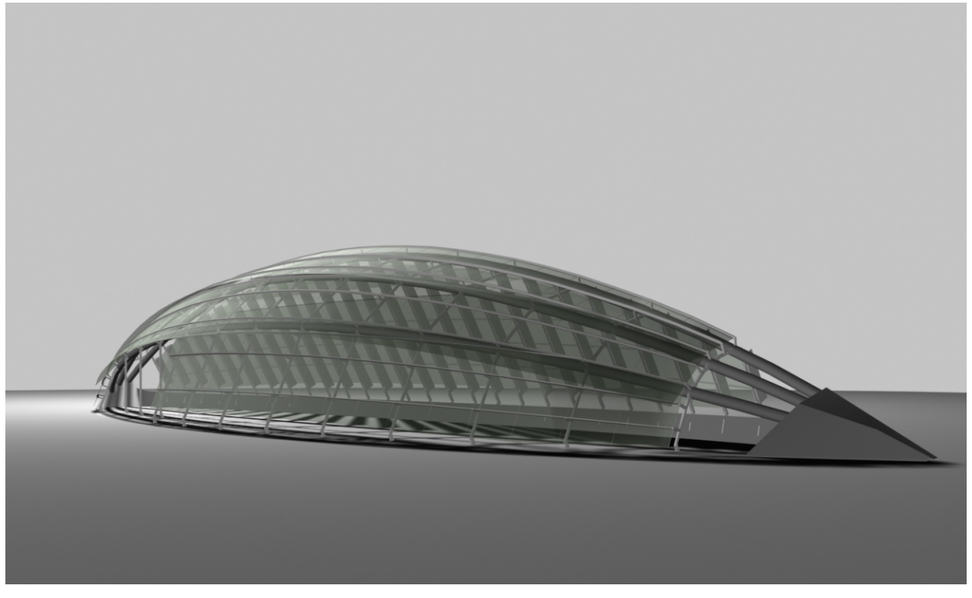
The bicycles will be stored (self service) using a double tier parking system allowing maximum density as well as easy access to upper tier storage racks. Each bicycle will be secured to its rack. 150 bikes will be stored in the double tier system while 30 will be suspended above the central aisle.

The retail will be separated from the parking area by sliding glazed doors typically to be open except during seasonal extremes. Visibility will allow surveillance of the bicycle parking.
The doors will be closed at non-business hours for security allowing exclusive access to the parking area by members.









3D Model Studies

Design Concepts